Caution: This Product May be Hazardous to Your Health!

Learning Objectives: Students will: (1) locate and interpret information on use, storage, disposal, and hazards of household products, (2) explain how disposal and storage of chemicals can cause potential groundwater contamination and (3) compare and contrast less harmful alternatives that can be used in place of many household hazardous products.

Subjects: Environmental Education, Health Education and Science

WMASs: EE: B.8.5, B.8.18, B.8.21

HE: A.8.2, B.8.4, D.8.2, G.8.3

SC: C.8.2, H.8.3

Grades: 6–9

This activity is divided into two parts: Part 1 is designed to teach students to read instructions and information on household chemical labels. In Part 2, students are asked to complete a home inventory of hazardous materials with the help of their parents.

Part 1: Reading Product Labels.

Materials:

- Reading Product Labels activity sheet
- Letter to Parents handout (for Home Search activity)
- A Home Chemical Search activity sheet (for Home Search activity)

Background: Many materials commonly found in our homes can be hazardous for children, adults and pets. The U.S. Environmental Protection Agency estimates that each home throws out an average of six pounds of hazardous waste every year. While six pounds may not seem like very much, it all adds up. A town of 10,000 homes can generate 60,000 pounds of hazardous waste in just one year! Take a quick inventory of materials you use and store in your kitchen, basement and garage. Many of the products you might find, including aerosol sprays, cleaners,

insect repellents and poisons, motor vehicle products, paints, paint thinners, furniture strippers and fabric stain removers are considered hazardous. They should be used, stored and disposed of with care.

Chances are the only advice you receive for using and storing these products is from the label on the container. Unfortunately, many product labels contain little or no information for disposal of leftover material or empty containers. If these products are poured or buried in the backyard or dumped into the drain or toilet they can soak through soils and reach groundwater (they can also run off into surface waters). Many products can also interfere with your wastewater treatment plant by killing bacteria essential for treating sewage.

It is important to read and follow product labels carefully to avoid possible illness, death and environmental damage that can result from misuse of or improper disposal of hazardous materials.

Procedure:

1. Using the following information, discuss what "hazardous" means. Explain toxic, corrosive, reactive, and ignitable.

   Hazardous materials and wastes are chemical substances that can harm, contaminate or kill living organisms. Hazardous materials have one or more of the following characteristics:

   - **Toxic:** Poisonous, potentially harmful to human health, can cause cancer and/or birth defects, and can contaminate, harm or kill fish and wildlife.
   - **Corrosive:** A substance that can corrode storage containers or damage human tissue if touched.
   - **Reactive:** An unstable substance that can react if exposed to heat, shock, air or water. Reactions include explosions.
   - **Ignitable:** A substance that can explode, catch fire or emit toxic gases or fumes into the environment.

2. Generate a list of hazardous materials from each category that might be found in the home. How do people know how to use, store and dispose of these materials?
3. Complete the "Reading Labels" activity sheet.
4. Discuss your answers.
   - How might this product find its way into groundwater?
   - What effects might contamination have on people drinking the water?
   - Can you think of any alternatives to using the product?
5. Distribute the "Household Chemical Search" activity sheet and the "Letter to Parents." Ask students to fill out only the first two columns on the activity sheet (i.e. mark with an X if the product is found and estimate the amount of chemical present). Go through the list of substances and possible locations in the home. Ask students if they have questions about any of the substances.

This activity can be an excellent opportunity for students and their parents to learn about hazardous chemicals together. **Remind students to ask their parents for help filling out the worksheet, to avoid touching any of the substances, to read container labels carefully and to wash**

their hands when through. Students should have 1–2 days to complete the inventory.

You might also investigate hazardous materials in your school by conducting a hazardous chemical search of your science room or cleaning supply closet!

Adapted from: Groundwater *Quality Protection in Oakland County: A Sourcebook for Teachers,* 1984, The East Michigan Environmental Action Council, 21220 West 14 Mile Road, Birmingham, MI 48010.

Part 2: A Home Chemical Search

Materials:

- Can Some of Your Household Products Harm You? Handout
- Household Hazardous Waste Wheel patterns and directions
- Completed Home Chemical Search activity sheet
- glue
- manila folders (2 per student)
- brads
- scissors

Procedure:

1. Distribute "Household Hazardous Waste Wheel" patterns, directions and materials. Construct Household Hazardous Waste Wheels (follow directions printed on activity sheet 8-6). When the wheels are complete, demonstrate how to use them. It would be helpful to have some examples of hazardous household products in the room.
2. Work in small groups. Using the "Can Some of Your Household Products Harm You?" handout, rate the toxicity of the products found in your homes. Ratings are 1–6, with 1 representing the least toxic materials and 6 the most toxic. Record your ratings on the "Home Chemical Search" activity sheet.
3. Calculate the total quantity of substances listed in each category (1–6) for your group. Using the Household Hazardous Waste Wheels, list directions for disposing of all products which are at least "very toxic" (a toxicity rating of 4 or greater). For all products which are at least "very toxic," also list at least one viable alternative to using the product.
4. Discuss the completed activity sheets.
   - What kinds of products were found in each toxicity category?
   - What was the total quantity of hazardous material in each category for your class?
   - What makes these products hazardous (e.g. toxic, corrosive, reactive, flammable)?
   - What alternatives were suggested?
   - How viable are these alternatives? Discuss advantages and disadvantages of using the alternatives and of using the products with a toxicity rating of 4 or greater.
   - Which products represent "needs" and which represent "wants?"
   - Using your homes as the average, estimate how much hazardous waste would be found in your community, in the state and in the nation.
   - How might these products enter groundwater?
   - How should these materials be disposed?
   - What kinds of warnings did you find on the containers? How can you tell if a product is considered hazardous?

Going beyond:

1. Research the disposal of household hazardous materials in your area. Does your county, city or town offer a Clean Sweep program? If so, when is it? What products should be taken there for disposal? How much hazardous waste is collected at the Clean Sweep each year? Does your community have a waste oil disposal facility? How much waste oil is collected there each year? What is done with the waste oil? Do people in your community know that these services exist? Do most people use them? If not, what do they do with their household hazardous waste? Your city/county Health Department should be able to provide information on household hazardous waste disposal programs or see box below.
2. For more information on alternatives to household hazardous wastes and options for disposal, see *Better Homes and Groundwater* included with the Groundwater Study Guide packet.

Adapted from: *Groundwater Quality Protection in Oakland County: A Sourcebook for Teachers,* 1984, The East Michigan Environmental Action Council, 21220 West 14 Mile Road, Birmingham, MI 48010.

Many counties, cities and towns offer a "Clean Sweep" collection program. This is an opportunity for home owners to bring household hazardous materials to a central location for safe disposal. To find out about Clean Sweep programs in your area, contact your city or county health department or visit the Department of Agriculture, Trade and Consumer Protection Clean Sweep website at **datcp.state.wi.us/arm/agriculture/pest-fert/pesticides/clean-sweep/index.jsp**.

Reading Product Labels Activity Sheet

ACTIVE INGREDIENTS:

Trisodium Phosphate	13.50 %
Sodium Sesqui Carbonate	1.90 %
Potassium hypochlorite	0.45 %
INERT INGREDIENTS:*	85.15 %

* Includes Sodium tripolyphosphate, color, perfume, quality control agents. Whiz Clean averages 31% phosphorus, in the form of phosphates.

Bleaches out food and stains

Cleans and disinfects

USE WHIZ CLEAN ANYWHERE IN YOUR HOME

Kitchens

Sinks: Whiz Clean cleans and whitens porcelain, cleans stainless steel to a sparkle.

Countertops, plastic surfaces. Whiz Clean bleaches out food, beverage, ink stains. Wet, sprinkle Whiz Clean, let soak, then rub only as needed. Rinse. Do not soak for long periods.

Pots and pans, stoves, ceramic cookware: Whiz Clean cuts grease, scours off cooked-on food.

Bathrooms

Sinks, tubs and showers: Whiz Clean disinfects as it cleans.

Ceramic tile, fixtures: Whiz Clean cleans to a sparkle.

Toilet bowls: Whiz Clean cleans and sanitizes. Sprinkle Whiz clean liberally into bowl, scour and flush.

WARNING: harmful to eyes and skin. If Whiz Clean Contacts eyes, flush with water and contact physician. Harmful or fatal if swallowed.

1. What is the brand name of this product? _____

2. What is the product used for?

_____

_____

3. What is the total weight of the product? _____

4. List three active ingredients and calculate the weight for each:

	Chemical Name	% Total Weight	Weight of the Ingredient
1			
2			
3			

5. How should the product be used? Circle all directions on the label.

6. Are there any directions, warnings, or precautions for protecting health and/or the environment? _____

   If so, then list them:

_____

_____

_____

_____

_____

_____

7. Does the label tell you how much to apply each time the product is used? _____

8. Approximately how many applications would it take to use the entire container? _____

9. Underline all instructions on the label for storing the product.

10. List instructions for disposing of the product or container:

_____

_____

_____

_____

_____

_____

Dear Parents:

As part of our study of groundwater quality, we are discussing management of household hazardous materials. Nearly everyone uses some type of hazardous material or product in the home. It is important that students be aware of potential health and environmental hazards associated with these products.

The unit on household hazardous materials has two themes:

1. *Identification and recognition of household hazardous materials.*

2. *Managing these products—to protect family health in the home and to protect groundwater quality.*

If quantities of household hazardous materials are poured down the drain or onto the backyard, the materials may reach groundwater or flow into nearby lakes and streams. Some can damage your home's plumbing and many can kill essential bacteria at wastewater treatment plants.

We need your help in completing a home activity. The instructions are printed on the activity sheet and can be easily followed by the student. We ask your help in working with the student for safety purposes.

Make sure that all containers of hazardous products are securely closed before beginning activity sheets. While activity sheets are being completed, stay with your child. When the sheets have been completed return the hazardous materials to a safe, child-proof location.

Thank you for your help and cooperation.

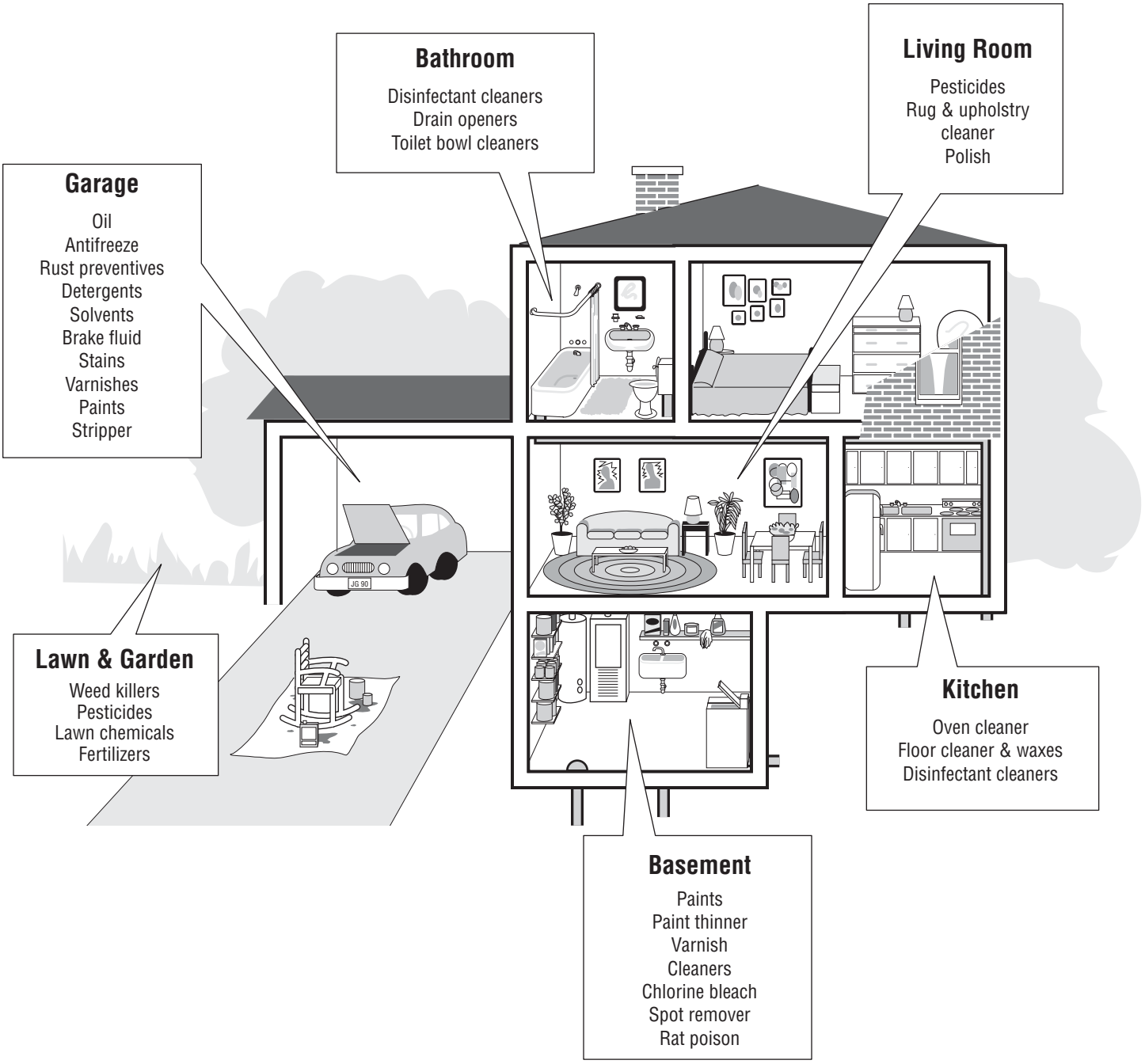
A Home Chemical Search Activity Sheet

Please read carefully. Before beginning this activity sheet, deliver the home chemical search letter to your parents. When you are completing this activity sheet, try to be as specific as possible in estimating the quantities of products but **Do not touch any of the substances.** Also, wash your hands when you are through to remove any chemical residues that may remain.

***Substance** (check if found)	***Estimated amount**	**Toxicity (1 t 6)**	**Proper disposal**	**Alternatives to use**
❒ used motor oil				
❒ old antifreeze				
❒ drain cleaners				
❒ abrasive cleaners				
❒ household disinfectants				
❒ old paint				
❒ stains or preservatives				
❒ solvents, paint thinners, turpentine paint strippers, finish removers				
❒ rat poison				
❒ insecticides (kill insects)				
❒ herbicides (kill weeds)				
❒ slug bait				
❒ other garden pesticides				
❒ pet flea collars				
❒ flea sprays				
❒ detergent				
❒ dry cleaning fluids, spot removers				
❒ bleach				
❒ other				
❒				
❒				
❒				

* Complete these columns only during home chemical search

Location of Household Hazardous Materials



Hazardous materials are chemical substances which can harm, contaminate or kill living organisms.

Hazardous materials are dangerous if they are not carefully handled and managed.

- If used or stored improperly in the home, chemicals can cause skin irritations, sickness and death.
- If disposed of improperly (e.g. poured down the sink or on the backyard) some chemicals can contaminate groundwater.
- With careful management, potential problems can be avoided.

Can Some of Your Household Products Harm You? Activity Sheet

Toxicity Rating	**Letal Dose** (for 150 lb. human)	**Household Products**
1—Almost Non-Toxic	more than 1 quart	Foods, candies, 'lead' pencils, eye makeup
2—Slightly toxic	1 pint to 1 quart	dry cell batteries, glass cleaner, deodorants and antiperspirants, hand soap
3—Moderately Toxic	1 ounce to 1 pint	antifreeze, automotive cleaners, household bleaches, many detergents, dry cleaners, most floor cleaners, metal cleaners, most oven cleaners, many general cleaners, most fuels, lubricating oils, most stain and spot removers, many disinfectants, floor polish, shoe polish, most paints
4—Very Toxic	1 teaspoon	most toilet bowl cleaners, some deodorizers, engine motor cleaners, some fertilizers, some paint brush cleaners, some pain and varnish removers, fireworks, some mildew proofing, air sanitizers, some paints , lacquer thinners, many pesticides, DDT, chlordane, heptachlor, lindane, mirex diazinon, malathion, diquatdibromide, endothal, 2,4D
5—Extremely Toxic	7 drops to 1 teaspoon	some insecticides, fungicides, rodenticides, herbicides; aldrin, eldrin, bidrin, methylparathion, paraquat, some fertilizers, mercury cell batteries
6—Super Toxic	a taste (less than 7 drops)	a few pesticides like: paroxon, phosdrin, parathion, isobenzan
Gosselin et. al. (1976) *Clinical Toxicology of Commercial Products*		

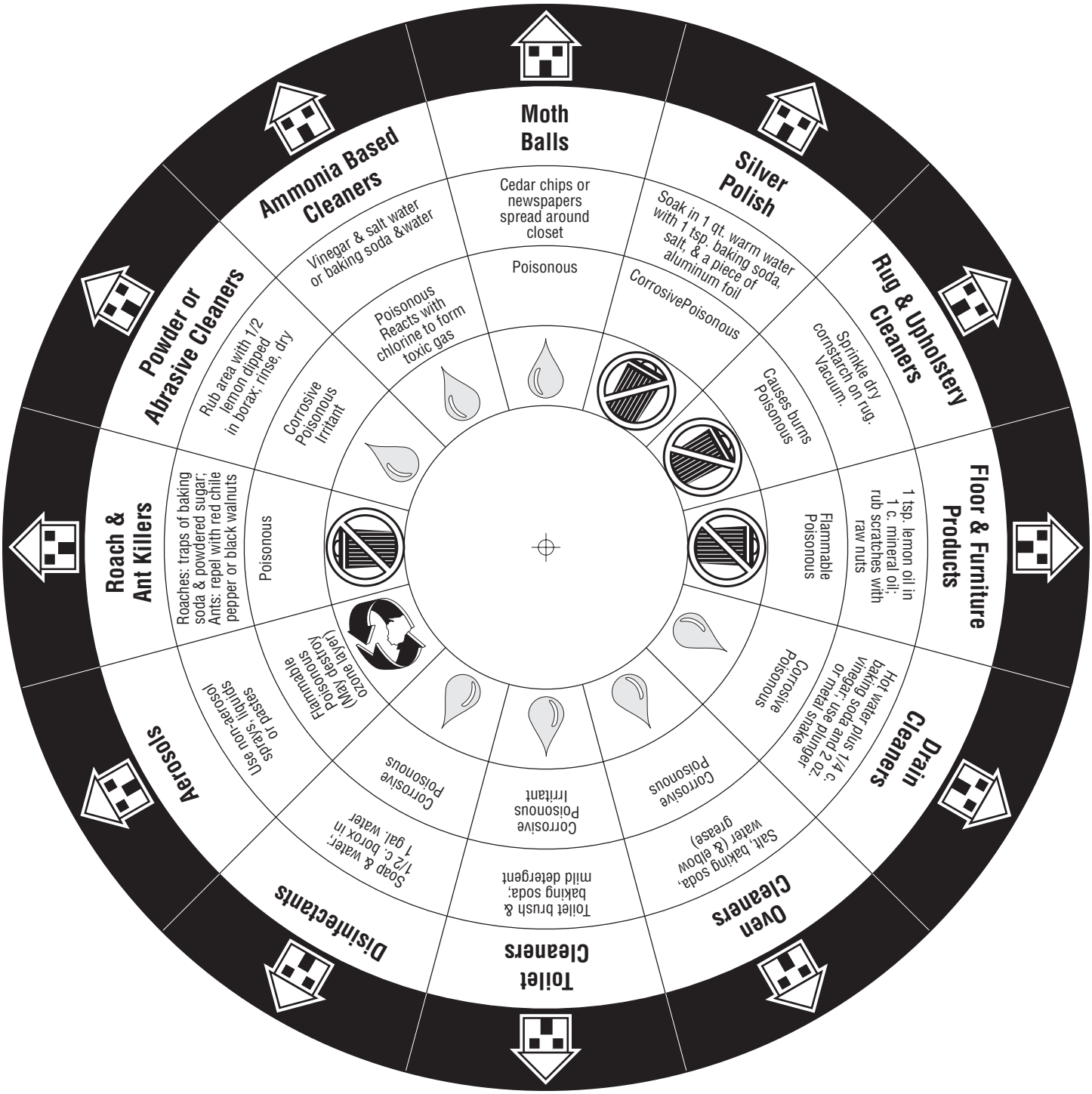
Directions for making the Household Hazardous Waste Wheel.

1. Cut a manila folder in half (along the fold).
2. Cut out wheel 1 found on this page.
3. Glue wheel 1 on one half of the manila folder.
4. Cut out manila folder around wheel 1.
5. Cut out wheel 2.
6. Paste wheel 2 on the back of wheel 1.
7. Make holder.

Wheel adapted from: ***Groundwater Resources and Educational Activities for Teaching.*** *1989. Iowa Department of Natural Resources*

Directions for making holder for Household Hazardous Waste Wheel.

1. Take manila folder and unfold it.
2. Place holder 1 on one side of the folder with the top along the fold.
3. Place holder 2 on the other side of the folder with top along the fold.
4. The tops of the two holders should touch each other along the fold — Do not cut this fold.
5. Glue holders to the manila folder and cut them out except for the top.
6. Place the wheels inside the holder. Line up the center of the circles and fasten with a brad.


Moth Balls
Cedar chips or newspapers spread around closet
Poisonous
Silver Polish
Soak in 1 qt. warm water with 1 tsp. baking soda, salt, & a piece of aluminum foil
CorrosivePoisonous
Rug & Upholstery Cleaners
Sprinkle dry cornstarch on rug. Vacuum.
Causes burns Poisonous
Floor & Furniture Products
1 tsp. lemon oil in 1 c. mineral oil; rub scratches with raw nuts
Flammable Poisonous
Drain Cleaners
Hot water plus 1/4 c. baking soda and 2 oz. vinegar; use plunger or metal snake
Corrosive Poisonous
Oven Cleaners
Salt, baking soda, water (& elbow grease)
Corrosive Poisonous
Toilet Cleaners
Toilet brush & baking soda; mild detergent
Corrosive Poisonous Irritant
Disinfectants
Soap & water; 1/2 c. borox in 1 gal. water
Corrosive Poisonous
Aerosols
Use non-aerosol sprays, liquids or pastes
Flammable Poisonous (May destroy ozone layer)
Roach & Ant Killers
Roaches: traps of baking soda & powdered sugar; Ants: repel with red chile pepper or black walnuts
Poisonous
Powder or Abrasive Cleaners
Rub area with 1/2 lemon dipped in borax; rinse, dry
Corrosive Poisonous Irritant
Ammonia Based Cleaners
Vinegar & salt water or baking soda &water
Poisonous Reacts with chlorine to form toxic gas


Transmission Fluid
None known except to use cars less
Poisonous
Brake Fluid
None known except to use cars less
Flammable Poisonous
Batteries
None known except to use cars less
Corrosive Poisonous
Paint Removers & Thinners
Use sandpaper
Dangerous for heart conditions Flammable Poisonous
Latex or Water Based Paint
White wash or Cassein-based paint
Flammable
Enamel or Oil Based Paint
Use latex or water based paint
Flammable Toxic
Pool Chemicals
None known
Corrosive Poisonous
Flea Collars & Sprays
Pennyroyal ointment; herbal collar, or brewers yeast in pet's diet
Poisonous
Insecticides & Herbicides
Weed often. use resistant varieties; remove infected plants
Poisonous
Chemical Fertilizers
Use peat moss, compost, blood & fish meal for N, bone meal for P
Causes burns Poisonous
Antifreeze
None known except to use cars less
Poisonous—don't leave puddles for children & pets
Used Oil
None known except to use cars less
Flammable Toxic

WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

GROUNDWATER
Wisconsin's
buried treasure

Household Hazardous Waste Wheel

Cut out
this window

Waste Category
Products
Alternatives
Immediate Hazards
Waste Disposal

Disposal Key:

Hazardous waste program

Do not dispose. Keep safely stored until a hazardous waste collection is held nearby.

Dispose with water

After product has been used, rinse container. Pour rinse water down drain that empties into a sanitary sewer with lots of water or reuse container according to label directions. Usually rinsed containers may be deposited in landfill.

Recycle

Bring to a reclamation center or find someone who can use it.

Special Disposal

Air dry latex paints in a cardboard box. Evaporate and solidify. Discard empty containers and cardboard boxes after drying.